

REMARKS

The Office Action has been carefully reviewed. Reconsideration and allowance of the claims in light of the foregoing amendments is respectfully requested. A petition and fee for a two-month extension of time is submitted herewith.

Claims 12 and 16-19 have been cancelled without prejudice. New claims 20 and 21 have been added.

Initially, the application received a restriction from the Office under 35 U.S.C. 121 between invention I, claims 1-8, drawn to a method of determining beryllium or a beryllium compound in a sample, classified in class 436, subclass 79; invention II, claims 9-15, drawn to a composition of matter, classified in class 252, subclass 301.26; invention III, claim 16, drawn to a compound, classified in class 546, subclass 137; invention IV, claims 17-18, drawn to a compound, classified in class 546, subclass 134; and, invention V, claim 19, drawn to a compound, classified in class 546, subclass 47. The inventions were stated to be distinct from one another as they are related as process and apparatus for its practice. The Office concluded that restriction for examination purposes was proper.

The Office Action noted that during a telephone conversation with Bruce H. Cottrell on May 18, 2005, a provisional election was made with traverse to prosecute the invention of Group I, claims 1-8. Because the search produced the applied Matsumiya reference directed to a method for measuring beryllium using the indicator of claims 4 and 9, the search burden for Group II is no longer present and Groups I and II, claims 1-15 are being rejoined by the Office for examination purposes. Affirmation of this election must be made by applicant in replying to this Office action. Claims 16-19 stand withdrawn from further consideration by the examiner, 38 CFR 1.14(b), as being drawn to a non-elected invention.

Applicants hereby confirm their provisional election of May 18, 2005 to prosecute the invention of group I, claims 1-7, now groups I and II, claims 1-15. Also, applicants withdraw their traversal of the restriction.

Claims 1, 3-6, 9-12 and 14 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumiya in view of Sill. The Office Action stated that in the paper Matsumiya teaches a fluorescence reagent, 10-hydroxybenzo[h]quinoline-7-sulfonate

(HBQS), for selective determination of beryllium(II) ion at pg cm^{-3} levels. A facile method was developed for the highly sensitive, selective determination of ultra-trace Be^{2+} using the fluorimetric reagent under extremely alkaline conditions, at pH 12.0. This reagent is quite suitable for the very small ion, Be^{2+} , to form a 6-membered chelate ring, compatible with a high fluorescence yield. Chelate stoichiometry is 1:1 for Be-HBQS at pH 12.0. The calibration graph gave a wide linear dynamic range, 2-100 nmol/dm^3 Be^{2+} with a detection limit (3s blank) of 0.52 nmol/dm^3 (4.7 pg/cm^3). Excellent sensitivity and toughness toward the matrix influence were demonstrated using the artificial sample solutions for airborne dust. Coupled with a simple masking procedure using EDTA, the method enables Be^{2+} determination at a nanomolar concentrations in the presence of metals at the natural abundance levels in airborne dust, typically Al, Ca, Cu, Fe, Mg, Pb and Zn at 130, 150, 1.0, 70, 33, 3.0, and 8.0 mmol/dm^3 , respectively, in the final solution. The proposed method was successfully used to determine Be in urban air. Page 2083 teaches the reagent being prepared by dissolving it in a slightly alkaline aqueous solution. The same page teaches heating a nitric acid solution for dissolution of the dust containing sample to bring it into solution. Matsumiya does not teach a buffer for the indicator solution.

The Office Action further stated that in the paper Sill teaches fluorometric determination of submicrogram quantities of beryllium. The increasing use of Be in the atomic energy program and the highly toxic nature of its compounds require a method of high sensitivity and reliability for its detection and determination. Although morin was the most sensitive reagent known at that time for the determination of Be, the available procedures were not particularly reliable at extremely low levels. A fluorometric method with morin was developed that had a detection limit of 0.0004 γ and a precision to 0.8% on 0.2 γ at the 95% confidence level. Reliability and precision were improved greatly through the use of a buffer system (page 598 and 601), an internal acid-base indicator, a permanent glass standard of fluorescence, and complexing agents. Detailed methods of separation of Be and application to air-dust and smear samples, urine, bone, ores and steel are given. They were checked at each step by using Be^7 as a tracer. The buffer system used was an amine buffer, piperidine, (page 599) at a pH of about 11.5 (page 601).

The Office Action concluded that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a buffer as taught by Sill in the Matsumiya composition and method because of the reduced affect from changes in alkalinity as taught by Sill.

Applicants submit that claims 1 and 9 have been amended to limit the buffer to an amino acid buffer. Support for this amendment can be found in the specification at page 5, lines 10-13 whereat it is described that the most preferable amine buffer is an amino acid. In view of this amendment, applicants submit that claims 1, 3-6, 9-11 and 14 are not obvious over Matsumiya in view of Sill as neither reference teaches or suggests an amino acid buffer. Accordingly, withdrawal of the rejection and allowance of these claims is urged.

Further, new claim 20 contains the limitation that after the sample suspected of containing beryllium or a beryllium compound is admixed with a dissolution solution for sufficient time whereby beryllium or a beryllium compound within said sample is dissolved, the mixing of a portion from that admixture is subsequently carried out, in the absence of any titration for pH adjustment, with an amine buffered solution containing a fluorescent indicator. Sill et al. explicitly set out a process including a detailed titration procedure (see page 600, 1st column, at the paragraph beginning "When the samples have all been ..."). Applicants describe in the specification at page 5, lines 3-5, the use of a final buffered solution that avoids titration. Similarly, in Example 8 at page 15, the process does not involve the interruption of any titration stage thereby allowing a more rapid process that may be field portable (also mentioned at page 5, line 5). Applicants submit that claim 20 is not obvious over Matsumiya in view of Sill as neither reference teaches or suggests a titration free process as in the present claim. Accordingly, allowance of this claim is also urged.

Claim 2 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumiya in view of Sill as applied to claim 1 above, and further in view of Missel. Matsumiya does not teach ammonium bifluoride as the dissolution solution. The Office Action stated that in the paper Missel discusses chemical milling of beryllium in which a chemical solution is used to dissolve or etch material from an object. The second paragraph of page 69 teaches that the etching rate of NH_4 bifluoride baths is reasonable and easier to control than that of H_2SO_4 baths. The acid etch gives a smoother surface,

but the bifluoride etch has less tendency to create deep pits. The third paragraph of the same page teaches that the etch rate for nitric acid is too slow. Additionally, table 1 shows that the temperature is about ambient temperature.

The Office Action concluded that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ammonium bifluoride of Missel as the dissolution solution in the Matsumiya method because of its reasonable removal rate and greater ease of control as taught by Missel.

Applicants submit that claim 2 is dependent upon claim 1 and will stand or fall with the independent claim. However, new claim 21 is urged to be allowable over Matsumiya in view of Sill, and further in view of Missel. Applicants submit that despite the teaching by Missel that both ammonium bifluoride and sulfuric acid can be used to dissolve beryllium, nothing in Missel would suggest the use of ammonium bifluoride in place of sulfuric acid so as to eliminate the need for titration steps. Accordingly, allowance of this claim is urged.

Claims 7-8, 13 and 15 stand objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The art of record fails to teach or fairly suggest the buffer being a lysine buffer as claimed in the respective process and composition claims.


Applicants have amended claims 7-8, 13 and 15 to be in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, these claims are believed to now be allowable.

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In view of the foregoing amendments and remarks, claims 1-6 and 9-12, 14, 20 and 21 are urged to be allowable over 35 U.S.C. 103. Claims 7-8, 13 and 15 are also now allowable. If the Examiner believes there are any unresolved issues despite this amendment, the Examiner is urged to contact the applicants' attorney undersigned below for a telephonic interview to resolve any such issue. A favorable action is solicited.

Respectfully submitted,

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